March 22, 1938. S. F. BRIGGS 2,111,923

REFRIGERATING UNIT

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Fig. 1.

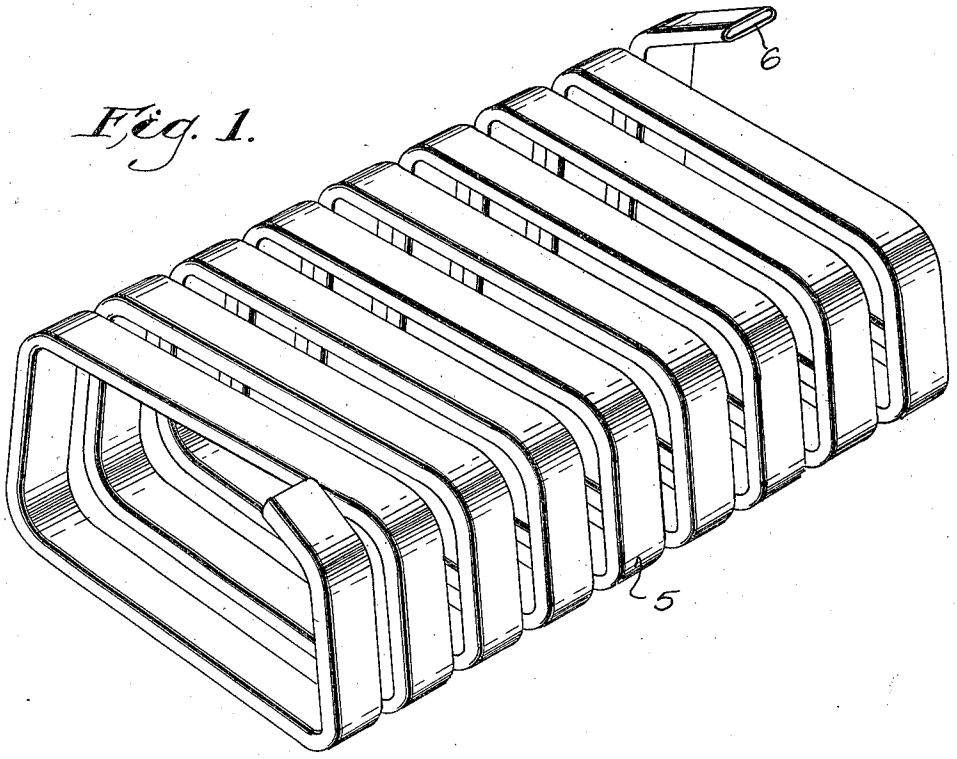
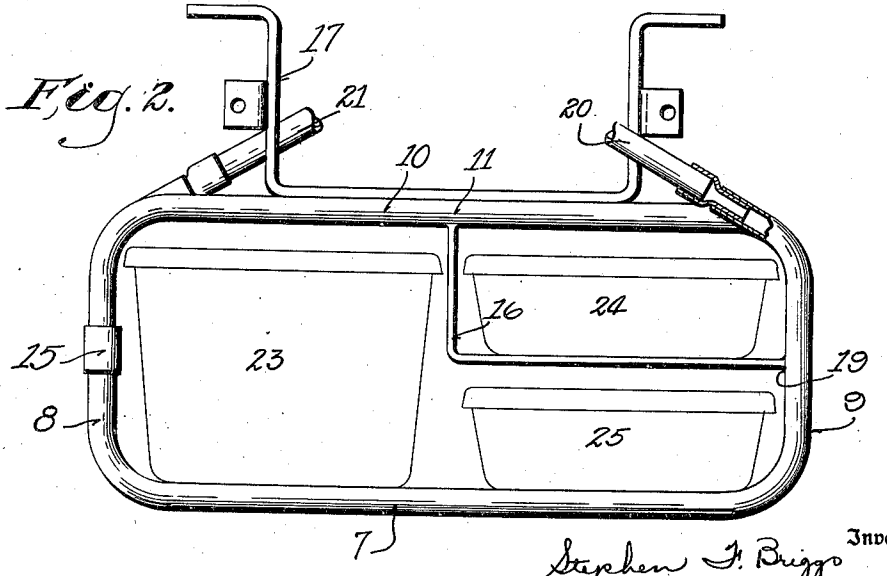


Fig. 2.



Inventor

Stephen F. Briggs

By

Wheeler, Wheeler & Wheeler

Attorneys

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Fig. 3.

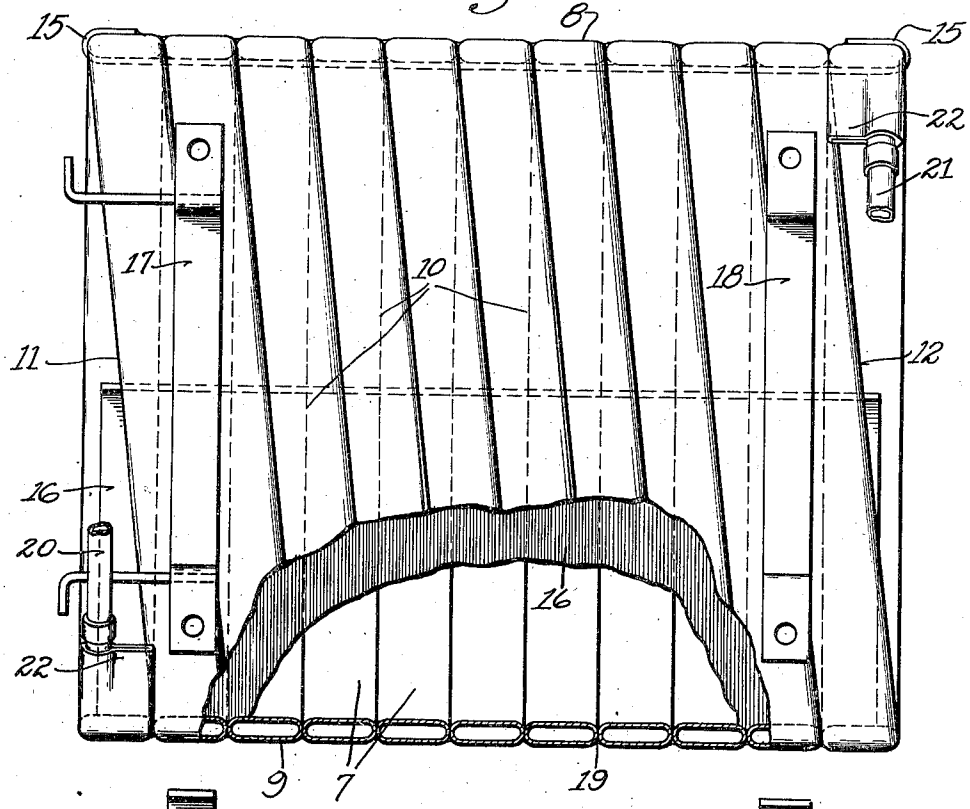
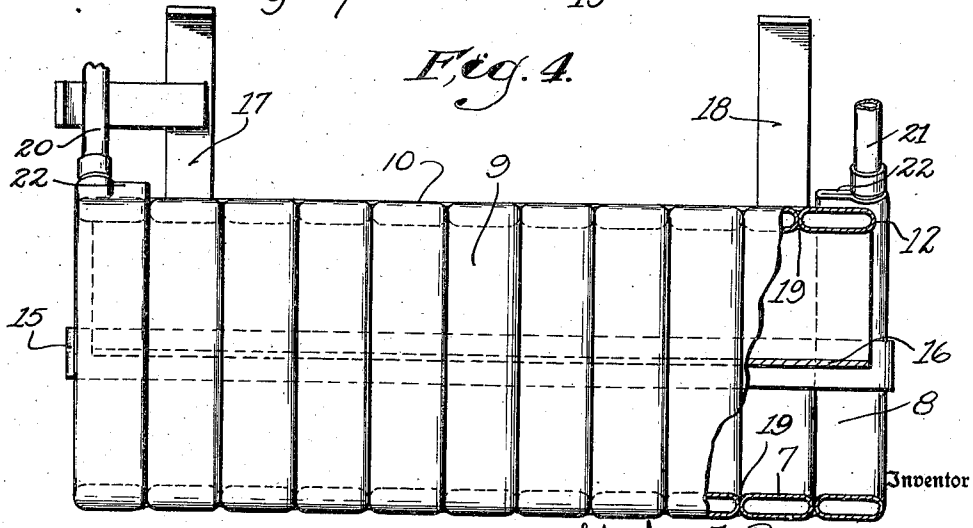


Fig. 4.



Inventor

By Stephen F. Briggs

Wheeler Wheeler & Wheeler

Attorneys

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UNITED STATES PATENT OFFICE

2,111,923

REFRIGERATING UNIT

Stephen F. Briggs, Detroit, Mich., assignor to Outboard, Marine & Manufacturing Company, Waukegan, Ill., a corporation of Delaware

Application October 10, 1936, Serial No. 105,001

5 Claims. (Cl. 62—126)

This invention relates to refrigerating units. More particularly it has reference to a combined freezing coil and tray support. The freezing coil is preferably, through not necessarily, an evaporator.

Broadly speaking, it is the primary object of the invention to provide a combined freezing coil and tray support and a method of manufacture thereof which will be inexpensive and at the same time will enable the unit to function more efficiently as a heat absorber than has been possible in the use of previous refrigerator units.

More particularly, I propose to eliminate metallic shells, separate tubes, tanks, and other structural elements which had heretofore been required and to deform a coil originally wound helically to reduce such a coil to a generally rectangular outline and to bond its successive turns to each other to comprise a rigid tray support whereof substantially all heat absorbing surfaces are in direct contact with the fluid contained within the coils of the tube.

Other objects of the invention will be apparent to those skilled in the art from the disclosure herein contained.

In the drawings:

Figure 1 is a view in perspective showing a coil wound as the first step in the making of my improved refrigerator unit.

Figure 2 is a front elevation of the completed unit.

Figure 3 is a view of the completed unit in plan as it appears with portions broken away to expose the interior construction.

Figure 4 is a view of the unit in side elevation.

Like parts are designated by the same reference characters throughout the several views.

I preferably wind a flattened helix such as that shown at 5, in Fig. 1, from a length of flat tubing, the preferred cross section being indicated at the end 6 thereof in Fig. 1. Such a coil may conveniently be wound with a conventional hand forming machine, or with special machinery built for the purpose, a chain or plug being placed on the inside of the tubing to prevent collapsing when the bends are made.

After it is formed, the coil is pressed together to eliminate the spaces between its successive turns. In a die or otherwise, it is then deformed to make the box-like units shown in Figs. 2, 3, and 4 wherein the bottom portion 7 of the several successive turns of the coil 5 are all parallel to each other, and at right angles to the major axis of the unit. The upright portions 8 at one side of the unit are likewise parallel to each other and are vertical and at right angles to the major axis of the unit. Similarly the upright portions 9 of the successive turns at opposite sides of the unit are parallel to each other and vertical and at right angles to the major axis.

This leaves the entire pitch of the original helix to be absorbed in the top portions 10 of the successive coils which have a sharp inclination from front to rear in the direction of winding as clearly appears in Fig. 3. The resulting coil is perfectly rectangular except at its top, front and rear margins 11 and 12 where the pitch is apparent.

The coils may be held in the indicated positions by any desired means. I prefer to use an anchor clip 15 extending along one side of the unit and hooked over the front and rear coils thereof as clearly shown in Fig. 3. At the other side of the unit I may solder into place a partition member 16 which is secured to the tops of the successive turns and to the sides thereof opposite to the position of clip 15.

For mounting the unit, I may solder or otherwise secure the brackets 17 and 18 to its upper surface. Thereupon the entire unit is preferably tinned or dipped in solder and the solder unites the successive turns as indicated at 19 to unify the entire structure.

The flat tubing 5 is preferably of much greater cross section than that ordinarily used so that such tubing per se eliminates any necessity for using the conventional tank. The ordinary supply and discharge tubes 20 and 21 may conveniently be inserted into the ends of the flattened evaporator coil tubing 5, as shown in Figs. 3 and 4, the portions of such tubes not required for communication with the pipes 20 and 21 being flattened as shown at 22 and the connection being thereupon soldered or otherwise sealed.

The coil will naturally be made of any ductile metal suitable for a heat exchanger,—copper, iron, or aluminum being preferred. If the unit comprises the evaporating unit of a refrigerator, it will, in general, be used in a system of the dry expansion type. Liquid refrigerant from a suitable control valve (not shown), will enter through one of the pipes 20 or 21 and its vapor will leave through the other after expanding throughout the unit.

By reason of the large cross section of the tubing used, the unit will have a large capacity to receive a considerable volume of low pressure refrigerant. At the same time, the movement of the refrigerant in one direction through the

flattened tubular section illustrated will result in a positive oil return such as makes a dry expansion unit desirable.

It will be observed from Fig. 2, that if the partition **16** is used the interior of the unit is divided into a number of parts, which are adapted to receive trays **23**, **24**, **25** for freezing purposes. The design may, however, be varied as desired.

Due to the fact that the coil itself comprises the tray support, there is no shell or lining intervening between the refrigerated surfaces of the coil and the object to be chilled. Consequently heat transfer occurs very efficiently from the interior of the unit and the exterior surfaces have also proved to function very efficiently in the cooling of a refrigerator cabinet. In effect the unit is an oblong box open at its ends but having closed sides entirely formed economically of the coils of a single tube in substantial contact to provide a continuous primary refrigerated surface.

I claim:

1. The method of making a refrigerator unit which consists in coiling a tube in the shape of a flattened helix of generally rectangular cross section and deforming said helix to bring three corresponding sides of the several turns into a common plane, substantially the entire pitch of the helix being absorbed in the fourth side, and securing together the several turns of the helix to comprise a self-supporting unit.

2. The method of making a refrigerator unit which comprises coiling a tube of large cross section in the form of a flattened helix of substantially rectangular cross section, forcing the successive turns of the helix into intimate relation, bonding such turns in said relation, inserting smaller supply and discharge pipes into the ends of the tube, flattening such ends to close them laterally adjacent said pipes and sealing said pipes in the ends of the tube.

3. A refrigerating unit comprising a flattened tube of sufficiently large cross section to comprise an evaporator, said tube having a flattened helical form and having its successive turns connected to comprise a self-supporting unit providing an interior chamber formed by the walls of the successive turns of the tube, and pipes leading to the respective ends of the tubes and of materially smaller cross section, those portions of the tube ends not required for communication with said pipes being flattened to mechanically position the respective pipes and being sealed therewith.

4. An evaporator comprising a flattened helix of flat tubing in substantially oblong form, a metallic coating bonding the successive turns of the helix for connection thereof, and a shelf having a substantially horizontal portion and a substantially vertical portion marginally connected to the side and top of the helix to be supported therefrom, said shelf dividing the interior of the helix into separate chambers.

5. An evaporator unit comprising a single coil of flattened tubing with curvilinear side walls, said tubing being in the form of a flattened helix of substantially oblong shape, three sides of each successive coil of said helix being in substantially the same plane and the entire pitch of said helix being absorbed in the remaining side thereof, the side walls of the tubing of the successive turns being in intimate contact with contiguous turns, and a metallic coating being applied to the entire helix and extending into the crevices between the said curvilinear side walls and comprising means for bonding the successive turns unitarily together.

STEPHEN F. BRIGGS.